Data Analysis for Game Development

Administrative

IMGD 2905

Outline

• Background
• Admin Stuff
• Motivation
• Objectives

Professor Background
(Who am I?)

• Mark Claypool (professor, “Mark”)
  – Professor
  – Computer Science
  – Interactive Media and Game Development
• Research interests
  – Multimedia performance
  – Congestion control (protocols, AQM)
  – Wireless networking
  – Network games
• Current gamin’
  – Overwatch
  – League of Legends
  – Oxenfree

Student Background
(Who are you?)

1. Year?
2. Major?
  a. IMGD Art or Tech
  b. Other
3. Background?
  a. Statistics
  b. Probability
4. Tools?
  a. Python
  b. Excel
5. Platform of Choice?
  a. Windows
  b. Linux
  c. Mac

Syllabus Stuff

• http://www.cs.wpi.edu/~imgd2905/d18
• Class: M, T, Th, Fr 10-10:50am
• Office hours (FL B24):
  – Mo 12-1pm, Tu 2-3pm, Th 9-10am, Fr 12-1pm
  – Or by appointment
• Email
  – claypool@cs.wpi.edu (me)
  – imgd2905-all@cs.wpi.edu (class + me)

Text Book

D.M. Levine and D.F. Stephan
“Even You Can Learn Statistics and Analytics”

• Unfortunate name, but good content depth to provide foundation for analytics
• Good examples, but not game-centric
Class Topics

- Data analysis tools and pipeline
- Statistics
- Visualizing and presenting data
- Probability
- Hypothesis testing
- Regression
- Apply topics to game data!
  - Commercial and custom
  - New and old

Course Structure

- Prerequisites
  - College algebra
  - No programming, stats, probability expected
  - No game analytics experience required
- Grading
  - Exams (30%)
  - Projects (55%)
  - Presentation (10%)
  - Participation (5%)
- On the Instruct Assist Website: https://ia.wpi.edu/imgd2905/
  - Authenticate with WPI login and password

Exams

- 2 exams, 30% of grade total
- Mid-term, Final (non-cumulative)
- Closed-note, Closed-paper, Closed-friend
- Generally, on material in class, but may have some parts from project
  → Test mastery of concepts that may not be evident from project reports

Projects

- 5 projects, 55% of grade total
  - Last project slightly larger
- Do game analysis on actual game data!
- Use game analytics pipeline
  - Typical flow for game (and other) analytics
  - Common tools used for analytics
- Multiple instances of analysis
  - Apply, become skilled with methods of synthesis, interpretation, presentation
    - “Lather, rinse, repeat”
    - Project 1 – today!

Presentation

- Everyone 1 presentation
- In-class, maximum 4 minutes long
  - Leave time for critique
- Content drawn from projects
- When? 1 person per class
  - Assigned at random
  - Stay tuned for schedule
  - 10% of grade

Peer-critique

- Feedback to become better presenters!
- Everyone will provide for every presenter
  - Short, written form
- Presenter will review
  - Turn in short, written reflection
  - Reflection due 1 week after presentation
  - 10% of grade

Participation

- Showing up to class matters
  - Come to class!
- Being engaged in class matters
  - Put down your phone/laptop!
- Ask questions, answer questions
- 5% of your grade
  - But much bigger indirect effect!
Slides
• On the class Web page
• PowerPoint and PDF
• Caution! Don’t rely upon slides alone! Use them as supplementary material
  – (come to class)

Timeline
• Tentative timeline for dates for exams and projects
  – In order to help you plan
  http://www.cs.wpi.edu/~imgd2905/d18/timeline.html
• Will notify if update

Why This Class?

Goals
• Gain proficiency using modern tools for data acquisition and analysis
• Understand basic probability and statistics as it applies to data analysis
• Develop skills for presenting game data analysis both orally and in written form

Objectives
• Use spreadsheet to analyze and visualize game data
• Use scripting language to extract and clean data recorded from game
• Apply summary statistics to game data
• Compute probability distributions for game data
• Write reports with graphs and tables illustrating analysis of game data
• Present game dataset report using appropriate visual aids

Why This Class?

• WPI IMGD requirements
  – Gotta take Math/Quantitative Science
• Statistics and Probability useful for game design and development
• Game Analytics similar to other forms of analytics (e.g., Data Science)
• Fun!
• Game analysis increasingly important (jobs!)

Why This Class? – Other

• Duties
  – Advise, define implement gameplay data to ensure understanding of player experience
  – Provide insights that impact game design and improve quality
  – Create and maintain player segmentation that allows understanding of engagement and spending
  – Mine data sets and develop dashboard for live service teams, game developers
  – Design and implement A/B experiments to test acquisition, engagement
  – Present findings and provide recommendations

• Requirements
  – BS/BA degree Stats, Math, Econ, CS or related
  – Experience with SQL
  – Experience with data visualization packages
  – Experience with statistical software
  – Experience with Amazon cloud services
  – Have created and presented visualizations and insights to various business groups
  – Passion for video games preferred

Game Play Data Analyst, Sony Interactive Entertainment
<table>
<thead>
<tr>
<th>Jobs</th>
<th>Analyst, Riot Games</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Duties</td>
<td>• Requirements</td>
</tr>
<tr>
<td>– Aggregate and analyze petabytes of game data from various sources</td>
<td>– BS/BA degree Stats, Math, Econ, CS or related</td>
</tr>
<tr>
<td>– Prep data for deeper analysis and/or reporting</td>
<td>• Graduate degree preferred</td>
</tr>
<tr>
<td>– Organize collected data into reliable intel that informs Rioters to improve player experience</td>
<td>– Business savvy</td>
</tr>
<tr>
<td>– Work with decision-makers to understand goals, identify opportunities, and inform decisions across company</td>
<td>• Technically adept</td>
</tr>
<tr>
<td>– Create awesome</td>
<td>• SQL, Python</td>
</tr>
<tr>
<td></td>
<td>• Excel, PowerPoint</td>
</tr>
<tr>
<td></td>
<td>• Communicator</td>
</tr>
<tr>
<td></td>
<td>• Reports clear, and concise</td>
</tr>
<tr>
<td></td>
<td>• Presentations to variety of audiences</td>
</tr>
</tbody>
</table>